The Official Newsletter of the Gwinnett Amateur Radio Society

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May 2021 GARS Meeting: Ryan Kovacs WG4I – VHF/UHF contests



# The Georgia QSO Party









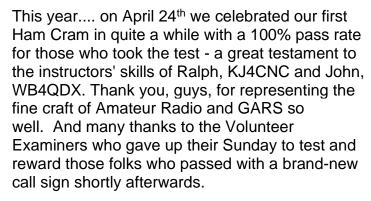




# **President's Message**

#### From the President...

Last year... early last year we were scrambling to the stores to get ever increasingly scarce items, such as toilet paper, gloves, masks, & cleaning wipes. All were essential to sanitizing our world and helping to combat various infections, including the Covid-19 pandemic. As vaccinations proceed, I continue to hope this pandemic will be behind us soon.



### Welcome our newest Hams:

KO4PVM Hope Collier
KO4PVN Sam Fenderson
KO4PVO Charles Grimes
KO4PVP Richard Mc Mahon
KO4PVQ Willard Steen

The **Dacula Memorial Day Parade** will be upon us very soon, so please sign up to volunteer with GARS to help stage and organize the parade participants. It really is fun being right in there with all the parade participants in their various costumes and glam. See the **GARS website** to sign up.

The Atlanta Radio Club just announced that the Atlanta Hamfest is cancelled, but there are still a few Ham-related activities, local and coming up. The AMRC Tucker Tailgating event was held May 1<sup>st</sup> and of course, the Stone Mountain Hamfest is scheduled to be held in November.

Last month, we had a program presented by the ARRL Vice President Jim Fenstermaker K9JF on the ARRL Foundation Scholarships. This



program came at an ideal time that should excite GARS about expanding our involvement with Education and Scholarship programs. We already support these programs when folks designate their donations to go to these endeavors, but now we have an opportunity to take our GARS donations to the ARRL for their Scholarship programs to a new level, plus give our own Scholarship and Education

programs a boost.

With the passing of a GARS family member comes the aftermath of mourning and dealing with possessions left behind. We've had a beloved GARS family member go 'Silent Key' last year. The surviving spouse, a Ham herself, has graciously donated to GARS a sizable quantity of Ham Radio and electronic equipment from the estate.

We intend to use the proceeds from this generous gift as funding for our Education and Scholarship programs. However, we'll need to assess the equipment to see what may be used in our current programs as well as what should be sold. Because there is so much equipment, we need a volunteer coordinator who can take control of the inventory by: cataloging, pricing, and working with other volunteers for liquidating the items. I have made a start by photographing and cataloging a few items to get a feel of this effort. Please contact me if you would be interested in this worthwhile endeavor for GARS, and to help out this GARS Family member. Contact me at ad4pz@arrl.net

See you in our May meeting event on zoom.

*73,* 

Joe Biddle, AD4PZ

Club President





# **GARS Meetings & Workshops**

## **GARS Meetings and Workshops**

Will be held online until further notice. See <a href="http://www.gars.org">http://www.gars.org</a> for more information

### **GARS Virtual Login and Zoom Etiquette**

Due to COVID-19 the following events are being held via Zoom video conferencing. login info will be posted to <a href="http://www.gars.org">http://www.gars.org</a> prior to the meeting.

### Meetings and Workshops are OPEN to all, feel free to share your invite with others.

- Workshops and Meetings will be recorded. By participating you consent to being recorded.
- Please change your display name to Your FirstName Call Sign, e.g. Hiram W1AW
- How to change Your Display Name in Zoom
- Please stay muted until ready to speak. Your space bar works like a PTT for un-muting
- To be fair to everyone, there will be a three minute limit for each person during Q & A
- You may ask questions in chat; please stay on topic while using chat.

### GARS Meetings Schedule (second Tuesday @ 7:00 PM):

- May 11, 2021 Ryan Kovacs WG4I VHF/UHF contests
- June 08, 2021 The yearly ICE CREAM Social at the Field Day site.

### Workshop Schedule (third Tuesday @ 7:00 PM):

- May 18, 2021 Bennett Smith WB5GVY Fire Hose 20 Minute Intro to 6 Meters & Meteor Scatter
- June 15, 2021 David Adcock KA4KKF GARS Field Day Chairman GARS Field Day Planning
- July 20, 2021 Your chance to speak Topic of your choice

### GARS Meeting – May 11, 2021

#### Ryan Kovacs WG4I – VHF/UHF contests

For the May GARS meeting, Ryan, WG4I, will be discussing the VHF/UHF contests, especially since the June VHF/UHF contest is coming soon (the second weekend in June). Ryan will not only be sharing his experiences with this contest (and his winning scores) but share ideas on how YOU can easily participate in these contests. In the past, the modes were more limited to SSB/CW but with the advent of FT8 and especially FM mode, this has really opened up the opportunity for all to participate. You can work mountain toppers, like Ryan, from your home QTH as well as from your car. If six meters is open as is typically the case in June, you will have a great opportunity to get some operating activities in your log.

Even if you are not a contester, it is always fun to see how far your signal will go line-of-sight especially if you are sitting on top of a hill somewhere.

### GARS Workshop – May 18, 2021

### Fire Hose – Intro to 6 Meters & Meteor Scatter Radio Sports

#### **Bennett Smith WB5GVY**

Bennett will whet your appetite to get on 6m "The Magic Band" and start making contacts. We have just entered the 6m season and Technicians are licensed for the whole band. Bennett's modest station consists of antennas in his attic due to HOA restrictions. He has confirmed 25 DXCC and over 370 grids on 6m. Learn how to use Sporadic E, Tropospheric Ducting, Transequatorial Propagation, and Meteor Scatter to make contacts using digital modes. Plenty of helpful hints and screenshots of what digital modes to use and how to make contacts. If this is not enough to whet your appetite take a look at his in-depth QRZ bio.

His presentation has 60 slides and 8 slides list his reference material. Seats are limited to the first 100.





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	GARS Communication				
	2 Meter Repeaters	6 Meter Repeater			
	147.075(+) MHz Tone 82.5 147.255(+) MHz Tone 107.2	53.110 (-1 MHz) No Tone (Offline for Maintenance)			
	1.25 Meter Repeater	Other Resources:			
	224.580(-) MHz Tone 100.0, 1.6 MHz Offset	<u>APRS</u>			
	70 Cm Repeaters	144.390 1200 Baud W4GR			
	444.525(+) MHz Tone 82.5	<u>D-STAR</u>			
442	442.100(+) MHz Tone 100 442.325(+) MHz Tone 100	WD4STR 145.060 + (1.4 MHz)			

440.550 + (5 MHz)

Don't forget to support our advertisers at the back of the GARzette.

Snail Mail Address:

GARS P.O. Box 492531 Lawrenceville, GA 30049

### **Notable Web Links**

Ham Radio Glossary: <a href="https://noji.com/hamradio/glossary.php">https://noji.com/hamradio/glossary.php</a> a very comprehensive listing provided by Noji Ratzlaff KNØJI. On his site there is also a lot of information about getting started in ham radio.

### Need Help – Let GARS Elmers answer your questions

Send an email to <a href="mailto:elmers@gars.org">elmers@gars.org</a> with the subject listing the area (like Antennas, Repeaters, Digital, DMR etc.) of your query to get to GARS Elmer volunteers.

The *GARzette* is the official monthly newsletter of the Gwinnett Amateur Radio Society, serving its members and other persons interested in the advancement of the Amateur Radio art.

Original articles, art, and photos are invited and encouraged. Previously copyrighted submissions cannot be accepted for reprinting unless permission from the appropriate publisher is provided in writing along with the information being submitted. If reprints are from publications allowing their unrestricted use, please include a copy of the printed permission contained in the publication.

If possible, bring your articles to the monthly meeting in Microsoft Word or rich text (.rtf) or text or HTML format or by e-mail to <a href="mailto:editor@gars.org">editor@gars.org</a>. Artwork can be accepted in most any graphics format and can be submitted via e-mail to the same address. Alternate means of submittal can be arranged when necessary.

In keeping with the Amateur Radio spirit, permission is hereby granted for the reproduction of The *GARzette* articles by other Amateur Radio club newsletters provided that proper credit is given to the individual author and *The GARzette*.

The GARzette is published each month with the assistance of Karen KI4HPP and Kyle W4KDA who print copies for distribution at meetings, etc. and Dave Bruse, W4DTR, who distributes the newsletter electronically.

<u>Deadline for submissions</u> is the <u>28th of each month</u> for inclusion in the <u>following month</u>'s issue.

For additional information view our Website at: <a href="http://www.gars.org">http://www.gars.org</a>

Newsletter Email: editor@gars.org\_Editor: Bob Hoffman, K4CQO Assistant Editor: Bill Eggers, WB2RIS

# GARS HELP WANTED

Speakers Needed for GARS Workshop Presentations, 3<sup>rd</sup> Tuesday of the month – Email workshop@gars.org to volunteer.

[PS— Articles to publish in the GARzette, either written by GARS members or published elsewhere, are always welcome. —Ed.]





# **GARS Happenings**

#### 20 Years ago in the May 2001 GARzette:

There was an article writeup on a GARS ham radio demo at the Lilburn Elementary School

- Frank Sauciunas KF4TQV had a good article on True Spirit of Ham Radio Helping others
- Andrea Hartlage, KG4IUM re-started On The Air and features David Adcock KA4KKF
- There was an "ask" for Dacula Parade volunteers things have not changed much
- GARS and Alford Memorial Club had a monthly get together ← what happened to those?

You can always browse the GARzette archive at <a href="http://www.gars.org/newsletters">http://www.gars.org/newsletters</a>

73, Bob, K4CQO, GARzette Editor









With over 300 members GARS is an active part of the Amateur Radio community serving the North Metro Atlanta area.

http://www.gars.org

# GARS HamCram Technician License Class Technician Ham Cram Results

It was held on Saturday, April 24 2021 and Sunday, April 25 2021

GARS had a Technician Ham Cram Class, the first one in over a year due to COVID, on April 24 and 25. At the exam session on the 25<sup>th</sup>, all five applicants passed! Congratulations to John, WB4QDX and Ralph, KJ4CNC for another job WELL DONE!!!

Exam session results: - 5 new Technicians

Special thanks to the Volunteer Examiners who made this exam session possible:

- John, WB4QDX
- Ralph, KJ4CNC
- Don, KK4NJM
- Bill, WB4WTN

- Earl, AF4FG
- Russell, AB4QQ
- Bob, K4CQO
- Donna, KM4FMW

Thanks & 73, Chuck McCord, KK4TKJ (Co-CVE)

Email: exams@gars.org





## **Dacula Memorial Day Parade**

The Dacula Memorial Day Parade is a go this year! Marvin Atherton, parade organizer, called tonight with the news that the mayor of Dacula gave the OK to hold one of the area's premier events on May 31<sup>st</sup>. GARS has agreed to help marshal the participants again continuing an association of more than 20 years with this event.

Canceled last year due to the Covid crisis, the parade usually takes more than five months to select a theme, secure the necessary permissions, organize 150 participants and do the hundred other things to make the parade a success. There isn't time to do all that so the parade will necessarily be smaller and may be a bit more chaotic. There probably won't be as many people this year as in previous years either as participants or spectators, but it will still be outside and offer a chance to use our radios while serving our community. Look for more information in the weeks ahead, in the meantime the sign-up sheet is posted on <a href="mailto:gars.org">gars.org</a>.

### Health and Wellbeing - Sandy Jackson, KJ4DRO

Look for this resource on <u>gars.org</u> and use it as a means to convey information about a GARS family member or Silent Key notification.





# **Net Managers Corner**

# Monday Night 2 Meter "Want, Swap, Sell, and Information Net"

# GARS NEEDS MEMBERS TO SERVE AS NET CONTROL STATIONS!

GARS is a great Amateur Radio service club with the membership and awards to prove it. Our club is very busy and active, and we use the Monday night net to get timely information out to our members. Weekly participation is needed to make our net function well. There is only a small group of very dedicated people who make the net happen each week, and we need more members to volunteer to serve as Net Control Stations (NCS) on a rotating basis.

Out of almost 300 members, there are only seven operators who serve as the NCS for the GARS net every Monday night. In no particular order, they are:

Don – KW4AL Ray – N4GYN Bill – WG9NUW David – KA4KKF Glen – W3WWT Russell – AB4QQ

Chuck – KK4TKJ Charlie – WS4TOT

As GARS Net Manager (Chuck KK4TKJ), I would like to have more volunteers to fill NCS positions. I do plan and post the schedule months in advance. Any conditions will be accommodated that you as a rotating NCS need to place on the scheduling of your duties. If your plans change, I can make adjustments for the schedule to work, and I will make those changes happen as soon as I am notified of a problem. As Net Manager, I also send out reminders each week to let the NCS scheduled know he or she is NCS for the next Monday night net. In short, serving as a rotating NCS is a small duty but a great contribution to the club. The "Want, Swap, Sell Information Net" begins promptly at 19:30 every Monday night and runs about 30 minutes. As a scheduled NCS, you will request the assistance of a volunteer alternate NCS each time you have Net Control. Your simple duties will be to tune in to the GARS repeater, read the script, take a few notes and forward the information to me for record keeping.

Please lend a hand and contact me at <a href="KK4TKJ@arrl.net">KK4TKJ@arrl.net</a>. Sign up to help support the effort that makes GARS the great club that it is.

73 and see you on the Nets!





# Georgia QSO Party & POTA

# The Adventures of K4M April 10-11, 2021 – GA QSO Party and POTA – by Bob Hensey - K4VBM

This is a tale of adventure of 3 hams who decided to try something new for the 2021 GA QSO party. These hams were Bob Hensey, K4VBM; Don Deal, KK4E; and Greg Gilbert, KN4APC. I (K4VBM) wanted to do something different this year for the GA QSO Party, and decided it would be fun to try something new that I hadn't done before, and recruited the above friends to join in the adventure.

Initially, we thought maybe roving would be the thing to try, but as we tried to put together a station in my minivan, it became clear that we just didn't have the time and expertise to pull off something like that for this year, so the plan was changed to try PORTABLE operation. I made an inquiry to the GA QP organizers regarding sitting on a county line, and the result was a new class with some new rules (including no county line sitting), and we were all-in for giving it a try. As we discussed plans, the idea came up of operating from GA State Parks in somewhat rare GA counties which would then include something else we had never done: POTA activations. We agreed to chase that plan and see what would happen.

Packing everything in the minivan about killed me (including a full size spare tire just in case), and a wagon for moving stuff (hey, I resemble an old man).



Bob reserved the K4M special event call sign (would have been great for roving). Don took on the task of finding some parks to operate from, and Greg provided the main radio, power supply, and battery for the adventure and helped test the set-up at Bob's house. The other 2 guys also provided various pieces of equipment and gear (antennas, cables, CW key, headsets, etc.) so that computer logging was possible, and even a GPS to locate our operating position at each park. We used Don's phone as a hotspot for the laptops, so we actually had (sometimes spotty) internet, which helped us overcome some software driver issues as well as self-spot.

Saturday, the weather was not with us as we headed to Tallulah Gorge State Park K-2202 in Rabun county. It rained most of the day - sometimes quite hard, and set-up was difficult and lots of problems with SWR. And it got colder as the day went by, which took a toll on these 3 old men.









We did manage to finally get some QSOs late and got kicked out of the park just when a great run on 40m Phone started. Due to the rain and problems, we had aborted our plan to more to another park that day.

Sunday, the weather was much better with just a few sprinkles early, sunny and cloudy with a stiff breeze. The first park was A.H. Stevens State Park K-2165 in Taliaferro county, and after more





problems including high SWR on the antenna which we fixed, we managed to get the 10 required QSOs for official POTA activation and a few more for a more respectable GA QSO Party entry at this point. We had decided to move to the 2<sup>nd</sup> park to practice teardown and set-up improvement ideas.



On the way to the 2<sup>nd</sup> park, we stopped off an exit to grab a bite for lunch at a Wendys, and then proceeded to Hard Labor Creek State Park K-2184 in Morgan County. Once again, we had SWR issues with the initial antenna set-up, so we moved it, and then it was fine. And yet more issues to overcome, like a power cable coming lose and no way to fix it (thank goodness for the spare power supply we brought). Here we had our best runs and really made up for our rookie mistakes. We even managed a few phone contacts on 15 meters which for Bob, was one of the top 3 highlights of the weekend - another being a great phone run on 40m. Don had a fantastic CW pile-up in the last hour on 40 meters with Bob lending a helping ear. Even Greg had a run earlier on 20 meters.

We all learned a lot about the difficulties of operating portable, but also enjoyed all the nice comments during the QSOs with the POTA chasers. And of course, even the hard core contesters were chasing us including some DX (OM2VL and DL3RXX). All-in-all, it was an adventure to remember and tell stories about, and we plan on doing some more POTA activations in the future. I recommend trying something new with friends, because in spite of all the problems, we sure had a lot of fun! I think Greg's comment sums it all up: "A nice road trip...with my friends...playing radio!"

The entire article is available on-line, see

http://www.gars.org/newsletters/2021 05 GARZETTE.pdf





# Hallicrafters Twins - Hallicrafters Answer to the S-Line

# Vintage Amateur Radio

de Bill Shadid, W9MXQ



This article shows the second product line by The Hallicrafters Company to move into the market created by Collins Radio Company and their S-Line Receiver, Transmitter, and Transceiver. Hallicrafters reinvented themselves in the release of their first installment, the SR-150 Transceiver that we detailed last month. Next, they released their SX-117 Receiver and HT-44 Transmitter. Like Collins, Hallicrafters focused on styling, ergonomics, and competitive performance in the new product entry. They kept the band coverage shown in the Collins 75S-1 while expanding the SX-117 a step beyond the Collins to cover the Broadcast Band and 160 meters – when properly optioned. Below you can see the Hallicrafters SX-117 and HT-44 station – with most of the related accessories – in operation at W9MXQ . . .



HT-44 Transmitter with the HA-8 Splatter Guard on top, PS-150-120 Speaker/Power Supply with the HA-1 'TO Keyer on top, SX-117 Receiver with the HA-10 LF/MF Tuner on top. Also, see the Astatic D-104 Microphone and Vibroplex VibroKeyer

(Picture mimics my first sight of this station – for the record, I never stack radios!!)

(This is a W9MXQ Shack Photo)

Hallicrafters was, in the late 1950's and into the 1960's, one of the largest producers of ham radio equipment and accessories in the world. In 1965, advertisements in QST and CQ Magazine showed the same station as above. That same advertising made the point that 1965 was Hallicrafters' 31st year in business. They told us that they had "19 products to answer any amateur requirement." They said their closest competition had "less than half that number." Much of their business was concentrated in the United States, but the company had a global reach with customers all over the "free world." Hallicrafters was widely known for publicity generating events – including sponsorship of DX-Peditions and many events collaborating with the United States Air Force and other government agencies.

In 1962, the SX-117 Receiver was released to the market. At the time, the matching HT-44 Transmitter

was a year away — and unannounced. Hindsight always being 20-20, an astute reader of technical specifications of the SX-117 at the time would perhaps have noticed that the receiver had a transmitter type VFO and back panel connections that betrayed its planned connection to a separate and matching transmitter. Sure enough, in 1963, along came the anticipated HT-44 Transmitter that did indeed interconnect with the SX-117. Those connections allowed frequency control of the HT-44 by the Transmitter or the Receiver. At the time, both Collins and Hallicrafters allowed completely split operation or transceiver control by the receiver VFO. Later, some manufactures would allow transceive control by either the transmitter or receiver VFO in addition to separate control. Another feature of the Hallicrafters SX-117/HT-44 combination is that they worked well in transceive on CW with a proper offset built into the frequency scheme. But, I must add that my friend, Bob, W9DYQ, would tell you that no self-respecting CW operator would operate this pair as a transceiver in Morse code operation! I must add that Hallicrafters upstaged Collins with the addition of a Notch filter — a point not ignored by Collins who added a Rejection Tuning (Q-Multiplier) feature to their upgraded 75S-3 Receiver.

In parallel to this new line, Hallicrafters also continued to produce "big iron" for the ham radio market due to their popularity. The famous Collins 75A-4 Receiver and KWS-1 Transmitter (reference an earlier installment in this series) were gone from the market by then. Hallicrafters made two such "big iron" stations. The highest cost and most spectacular setup was the SX-115 Receiver, HT-32B Transmitter, and HT-33B Linear Amplifier. Also, a lower cost version of that setup was the SX-111 Receiver, HT-37 Transmitter, and HT-41 Linear Amplifier. The SX-117/HT-32B/HT-33B lasted into 1964 but by then the lower cost SX-111/HT-37 station was gone. (The HT-41 Linear Amplifier went on a bit longer.) Hallicrafters based the SX-117 on the technically advanced SX-115 Receiver while the HT-44 was based, in some ways, on the HT-37 Transmitter. So, the family heritage moved forward. To those of you interested in this line, the SX-117 was a technically advanced version of the SX-115 receiver while the SX-111 was basically a low cost SX-101. This "big iron" will be back for your review in a later installment.

Like the SX-115, the SX-117 Receiver used a triple conversion scheme with a low noise 50.75 kHz third conversion – well known at the time in Hallicrafters radios for characteristically quiet receiver operation. Unlike some early SSB Receivers – but like the late versions of the SX-101 and SX-115 Receivers – the SX-117 used a Product Detector for demodulating SSB and CW signals. This change in receiver design in this period added to much improved AGC action. Before this, the practice of riding the RF Gain while keeping the AF Gain high began to fade. Today, this practice is virtually unknown to new operators. (But, it is very necessary to those of us using vintage gear even somewhat into the vintage of the SX-115 and SX-117!) I suggest that if you are interested in the design philosophy of the SX-117, check its ARRL Review in the May 1963 issue of *QST Magazine*. Personal experience says that the SX-115, while superior in several ways, could have benefitted by some features of the SX-117 – so all things considered, the SX-115 seems to be more superior from a reputation standpoint than from an operational one. Make no mistake, however, they are both fine radios.

The one shortcoming in Hallicrafters receivers of the time, including the much beloved SX-115, was that they stayed with what I refer to as tuned circuit i-f filters – avoiding costly mechanical or crystal bandpass filters. Collins receivers, starting with the 75A-4 Receiver, remain competitive to this day due to the design that included Collins mechanical filters. You will see in future installments that Heathkit, Drake, National, and others beat Hallicrafters at their own game by including crystal filters in their competitive designs. Indeed, Hallicrafters did the same thing in their SR-150 Transceiver – and came back to that design in their later products. These too will be seen in future installments.

The HT-44 Transmitter is a clever adaptation of an unexpected technology, from my point of view. In keeping with the thinking at Hallicrafters to avoid expensive crystal filters, they left behind the Crystal Filter SSB Generation successfully used in the early 1950's HT-30 Transmitter, the later HT-32 Series Transmitter, and the SR-150 Transceiver. Instead, they borrowed from the technology used in their very popular, lower cost, "big iron" transmitter – the HT-37 – and used Phasing SSB Generation. I will

leave the description of the different methods of SSB Generation to your study of the *The Radio Amateur's Handbook* from the American Radio Relay League. My favorite treatment of that subject appears in the 1963 and 1964 editions of that Handbook, beginning on page 305 (in both editions). But, it can be found well before that and right up to my 2018 edition. Why do I prefer the 1963 edition? It is described with vacuum tubes!

For the record, the Hallicrafters HT-44 had a rated input power of 200 watts on 80-10 meters for SSB and CW. Output power was 100 watts with a bit less on 10 meters. The HT-44 here at W9MXQ meets that specification and more (but is held to no more than 100 watts output). The final amplifier uses a pair of 6DQ5B Tetrodes. The 6DQ5B's in the HT-44 here are date coded 1964 and are branded "Hallicrafters." That means they were the original final tubes with the transmitter when it was delivered from the factory.

Hallicrafters' path to this transmitter design must have been a real study in their engineering department. Transmitter development for generating a Single Sideband (SSB) signal had been split in the industry with signal generation using the Filter Method and the Phasing Method. The differences in these designs are the subject for another article but suffice it to say that by the early 1960's most of the industry had moved to the Filter Method. (Collins' use of Mechanical Filters put them in the "Filter" camp – application of crystal or mechanical filters is the same as far as circuit results are concerned.) Hallicrafters by that time had significant experience in both methods with good experience in the Filter Method with the HT-30, HT-32 series, and the SR-150. However, the Phasing Method was successfully used with the popularly priced HT-37 Transmitter. In what I consider a surprise after the recent release of the SR-150, Hallicrafters installed a phasing SSB generator in the new HT-44 Transmitter. Any concerns about sideband suppression stability – somewhat of a problem in the HT-37 Transmitter – were solved in the successful and stable HT-44. At least in the time of the HT-44, the Phasing Method produced a more robust audio sound at the receiving end of the communication circuit. (This is a subjective comment based on personal experience – not a scientific analysis! This almost certainly is a product of a wider signal bandwidth in the HT-44.)

My experience is that using a HT-44 Transmitter in a ham station generates a significant number of audio complements. And, as if to tell the world that Hallicrafters had solved stability issues with Phasing SSB Generation, they moved the carrier balance control off the front panel (as on the HT-37) and placed it inside the cabinet under the top cover. Their confidence was well founded. My use of the HT-44 Transmitter rarely, if ever, needs that control to be adjusted once set. Even many crystal filter transmitters were not that stable – and some of them, such as Swan, had balance controls on the front panel.

I must add that using the HT-44 Transmitter (as with the transmitter section of the SR-150 Transceiver) is ultra-simple. The radio is fix tuned for a 50-75-ohm feedline and, as such, has no Load Control. Tuning the transmitter merely involved peaking the frequency calibrated Driver and Plate controls for maximum output on the front panel RF output meter.

Accessories used with the SX-117 and HT-44 Station included some interesting items. They are included in this article – starting just below.

I reference above that the SX-117 Receiver took a step beyond its Collins competition (the 75S-1 Receiver) by providing for more frequency coverage. Like the Collins radio, the SX-117 alone allowed for additional coverage – between 3.5 to 30 MHz in the standard equipment receiver. With the addition of the HA-10 LF/MF Tuner, however, the SX-117 could cover from what we now refer to as VLF to past 160 meters and up to just below 80 meters.





The HA-10 is a W9MXQ Shack Photo

The HA-10 LF/MF Tuner allows the SX-117 to tune from 85 kHz to 3 MHz using properly assigned Range Crystals in the receiver. The general coverage operation (coverage outside 80-10 meters) required the addition of an optional auxiliary crystal oscillator which was nothing more involved than plugging a 6EA8 tube into the oscillator tube socket. The circuit was included with the receiver. Only the tube was missing. In one of those radio collector mysteries, Hallicrafters did not always include the "h" red ball logo on this tuner (above the lettering, "HA-10.") See it in the at the right side of the HA-8 Splatter Guard front panel, below. Some advertising had the logo, and some did not. My HA-10 does not have it.

I think the most unique accessory for the HT-44 Transmitter is the HA-8 Splatter Guard. If anything, the HA-8 is best described as a poor man's monitor scope.



The HA-8 is a W9MXQ Shack Photo

The HA-8 Splatter Guard with its small feed-line coaxial sensor monitors the modulation level of signals especially SSB signals. It used an EM-84/6FG6 "Magic Eye" tube. Used properly it senses power from 40 to 1,000 watts with insignificant insertion loss between 3.5 and 30 MHz. Higher frequencies up to past two meters are possible with a bit of a penalty of mismatch. However, the unit was designed as an HT-44 accessory. Setup involves adjusting the Sensitivity control at full carrier power so that the beams on the "Magic Eye" just close - "beams" from the left and right move toward the center from each side. During SSB Modulation one watches for the beams to stay at, or below, the center. A bright vertical line forms at the center if one over modulates.

In my SX-117 and HT-44 Station I use the Hallicrafters PS-150-120 Power Supply and Speaker Console. You saw a picture of this Power Supply in the installment of for the SR-150 Transceiver. The model number of this unit takes its "150" from that transceiver. The "120" designates the AC power supply line voltage.



The PS-150-120 is a W9MXQ Shack Photo

The PS-150-120 supplied necessary voltages to operate the HT-44 Transmitter or the SR-150 Transceiver. The Power Supply included a speaker for use with the SX-117 Receiver (or the SR-150 Transceiver). Connections for the speaker in an SX-117/HT-44 installation were routed through the transmitter via receiver/transmitter interconnections. Hallicrafters used only solidstate devices (silicon diodes) in the power supply and avoided the vacuum tube circuitry used in the Collins 516F-2 Power Supply (which, by the way, did not include a speaker). Also, Hallicrafters included pin connector sockets on the chassis to allow reading of plate current and voltage with a simply Volt-Ohm-Meter. Hallicrafters sold this unit internationally but I have not seen any evidence of there being a "PS-150-220" variant for use with 220volt circuits. Nor have I seen a 220-volt version of the SX-117. I believe at the time it was more common to use a 220 to 110 VAC step-down transformer.







Hallicrafters HA-1 'TO Keyer (The HA-1 is a W9MXQ Shack Photo)



Hallicrafters HA-1A 'TO Keyer (The HA-1A is a W9DYQ Shack Photo)

The HA-1 'TO Keyer was a non-lambic Electronic Keyer using six vacuum tubes, two of which are regulators. The Keyer has a sidetone generator (not a transmitter feature in those days) and a mercury-wetted relay for keying. Keying contacts were designed to take up to 500 volts at up to 250 VA. Imagine that in today's Keyers! There was a later version of this Keyer, called the HA-1A that pretty much used the same design with knobs and front panel lettering to compliment the latest Hallicrafters products. Note differences in pictures, above. Incidentally, the Keyer was named by Hallicrafters after W9TO, designer of the circuit.

A major accessory for the SX-117 and HT-44 was the HT-45 "Loudenboomer" Linear Amplifier – this is not the first in Hallicrafters policy of naming radios in addition to model numbers. Recall other names such as "Sky Buddy," "Ultra Skyrider," "Sky Challenger," and the later "Tornado," "Cyclone," "Hurricane," and "Safari" radios we have yet to cover in this series. The Loudenboomer will be covered in a future installment detailing its design use with the SX-117/HT-44 and with the SR-150 Transceiver.



The matching Hallicrafters HT-45 Loudenboomer Mark IIA Linear Amplifier. A Story for a future installment. Not shown is Model P-45, 3,000 (VDC) Power Supply

The HT-45 is a W9MXQ Shack Photo

This equipment has been with me for over 30 years. I came via a chance meeting with a fellow during the time when my QTH was in Columbus, Ohio. Back at that time, vintage gear did not carry near the value it does today – treated then more like useless "stuff." The owner was a friend of a local ham radio store manager and he was looking to find a good home for his SX-117, HT-44, PS-150-120, and the HA-8 Splatter Guard. Also, part of the package was the HT-45 Linear Amplifier and its matching P-45 High Voltage Power Supply. He asked simply that I promise to keep it and to take care of it – and pay him the shipping cost to get it from his QTH in Pittsburg, Pennsylvania, to my QTH in Columbus, Ohio. Obviously (!!!), I accepted the offer and have never gone back on my word to keep and maintain the set. It looks and works like new – and even includes the original Hallicrafters shipping boxes for the receiver and transmitter. I am only the second owner of the SX-117, HT-44, and PS-150-120 (and also the HT-45 and its matching P-45 Power Supply).

The HA-1 'TO Keyer came to me from a Hamfest as did the HA-8 Splatter Guard. The HA-10 LF/MF Tuner came via Bob, W9DYQ, friend from childhood and fellow collector and owner of two SX-117 and HT-44 stations. Bob has the Radio Industries Loudenboomer Linear Amplifier which preceded the HT-



45. More about that story when we talk about the HT-45. (To wet your appetite for this story, Radio Industries was a division of Hallicrafters, based in Kansas City.)

The SX-117 Receiver enjoyed wide popularity – maybe a bit more than its mate, the HT-44 Transmitter. To this day, you can spot SX-117 Receivers in pictures of ham shacks around the world. There are also many SX-117/HT-44 pairs still in operation here and there. They are not hard to find – but ones in pristine condition are somewhat rare. They have all aluminum cabinetry construction and at the time of their manufacture the technology of getting paint to stick to aluminum was not well developed. Many of these radios have good, sound cabinets but flaking paint. I am very fortunate to have a set with nearly flawless paint. Perhaps that is more due to the care these radios get at W9MXQ than in them being painted any better than their sisters and brothers from the production line. Unlike today, in 1963 when the SX-117 was introduced, it was regular practice to have a receiver from one manufacturer and a transmitter from another. The system approach, introduced by Collins and the S-Line, started the trend to have a complete station with a single brand of radio and all accessories.

Today the SX-117 suffers from a lack of selectivity in competitive situations – recall my comments, above, about the "filtering" in the receiver. But, sitting in front of this set on a Sunday afternoon on a 40-meter rag chew is pure joy. Super audio on both sides of the circuit reminds me of what ham radio once was – and still can be. Listening to the golden tones of the SX-117 on CW must be experienced – as is the excellent, smooth CW keying from the HT-44. Give a listen if you have the opportunity!

Sincerest thanks to Bob, W9DYQ, for his assistance and proof reading.

© W9MXQ

The entire article is available on-line, see

http://www.gars.org/newsletters/2021\_05\_GARZETTE.pdf





# **GARS Membership**

## **April New GARS Members**

John Longo (W5BMW)

**New Members: 1** 

Total Members as of April 30, 2021 343

Join GARS members for our weekly breakfast gathering at
7:30 AM most Saturdays
Now at
Cracker Barrel Restaurant
75 Celebration Dr.
Suwanee, GA 30024

## **May GARS Birthdays**

Timothy Atkin Bill Bentley (KJ4MXM) Caryn Brant Charles Chauvin (W4CLC) Joseph Coker (KD4VHD) Maggie Colley (KM4PTW) Steve Garrison (N4TTY) Bob Gerzoff (WK2Y) Bill Grimes (WG9NUW) David Griscavage (W3GZS) Phyllis Harden (KN4AEZ) Bill Hawkins (WR1TR) Harry Heath (KO4FGK) Tim Johnson (KN4RFP) Sachiko Londono Frederick Love (KK4VEP) David Mattison (KD4PCK) Delmar Mc Cue (K0DCM) Dallas Mellichamp (N4DDM) Anita Morris (KG4AJX) Robert Prisant (KN4GZG) Ted Ruchalski (KK4DFM) Ade Shamblin (KJ4CUY) Rebecca Simonsen (KO4ESI) Nathan Smith (W4GOP) Larry Thill (W4LJT) Brad Wagner (N4BEW)

#### **GARS MEMBERSHIP**

Your current GARS membership status is shown in the monthly newsletter e-mail towards the bottom of the message.

To become a GARS member, or to renew your GARS membership, please visit our website—http://www.gars.org

To make changes to your GARS membership (moved, new e-mail address, new phone number, etc.), please e-mail the Membership Committee - membership@gars.org

You can renew or update your Amateur Radio license information with the FCC at their website for free http://wireless.fcc.gov/uls/index.htm?job=home

To update your ARRL information, please visit their website - http://www.arrl.org

Membership Chair: Karen Albritton, KI4HPP Committee Members: Dave Bruse, W4DTR





Repeater Status					
6M	Currently down				
147.075	Operational in Snellville				
147.255	147.255 Operational in Snellville				
224.580 Operational in Grayson					
442.100 Operational at Goshen Springs					
442.325 Operational in Buford					
444.525	Operational in Snellville				
Link remote receivers being added					
D (' ( - O A B O					

### **Donating to GARS**

Your GARS donation can be used for a certain purpose by donating to one of these funds:

- GARS SK Memorial Fund for Education (to remember and honor Silent Keys);
- GARS Scholarship Fund (Administered by the ARRL for awarding scholarships);
- GARS General Fund (any club purpose).

GARS has joined these rewards programs (a portion of every purchase you make through these merchants may be donated to GARS):

- Amazon Smiles;
- Kroger Community Rewards program.

For more information on how to sign up for these rewards programs, or to donate to GARS, visit

http://gars.org/gars/donations-to-the-club

# **GARS on Social Media**

DISCORD

Discord Request:

http://gars.org/discord

Groups.io:
http://gars.org/groups.io

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> Join GARS on YouTube: http://gars.org/youtube







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Kevin Scott, Program Manager	K4GTR			
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Dave Bruse, VE Team Leader	W4DTR			
David Adcock, Webmaster and Field Day Chair	KA4KKF			
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Joe Biddle, Winter Field Day Chair	AD4PZ			
Kyle Albritton, Multimedia Chair	W4KDA	(E)		
Don Stewart, Elmer Manager	KW4AL			
Sandy Jackson, Health and Wellbeing	KJ4DRO			
Dave Slotter, Georgia QSO Party Chair, Workshop Leader and Public Information Officer	W3DJS			
Directors and Trustees				
John Davis, WB4QDX Rick Cobb, N4XYY		-		
Mike Weathers, ND4V Bill Cherepy, WB4WTN W4GR	R Trustee			





# **GARS Meeting Minutes**

# Gwinnett Amateur Radio Society – GENERAL 4/13/2021

President Joe Biddle (AD4PZ) and Opened the meeting at 7:00pm and Closed the meeting at 8:35 pm

(Covid-19 Alternative Online)

EAA Facility, 690 Hanger Rd. Lawrenceville, GA.

Online participants: 38

**Treasurer Report:** Joe (AD4PZ)

Presented the financial report.

Membership Report: Joe (AD4PZ)

Reported the Membership is at 342

Programs -Kevin (K4GTR)

 Upcoming programing Will focus on June UHF/VHF contest

Workshop - Dave (W3DJS)

 April 20 – Bob Wilson N6PB – everything you need to know about USB interfaces

GA QSO party - Dave W3DJS

Thanked participants

 Participants please submit logs with the name GwinnettARS as club name.

Dog Show follow up - David (KA4KKF)

 The kennel club is requesting more help from us as well as collaboration on prep next year.

Memorial Day Parade - Earl (AF4FG)

Requested volunteers

 Announced program to review parking and organization

Field Day – David (KA4KKF)

Google sheets link sent out via groups.io

In discussion of how many stations and the mix.

 Two classifications – Field day with the club, or under our own call with points going to the club as a combined score

W4GR call only to be used at the Field Day sight.

<u>Health and Well Being Committee</u> – Joe (AD4PZ)

 New committee with single point of contact to support members with health or wellbeing issues

Sandy is heading up the committee.

Information is on the GARS.ORG site

#### Meeting in Person - Joe (AD4PZ)

- June meeting will be ice cream social at the Field Day sight
- June Field Day will be our second in person meeting
- July first meeting at the hangar with Zoom for those that do not wish to attend in person.

<u>Program</u> - Jim Fenstermaker (K9JF) – Scholarship and grant programs.

\*\*Future Event dates are recorded at the time of the General Meeting and subject to change.

Submitted by: Bill Hawkins (WR1TR) GARS Secretary

### Workshop Minutes - April 20, 2021

Number in Attendance: 42

Workshop Topic: Everything You Need to Know About

USB and Serial Interfaces

Presenter: Bob Wilson N6TV

**Brief Summary:** Bob N6TV went into great detail on how to set up your Serial and USB ports to control your rig for contesting, DX, or just getting the most out of your gig/station. You should check out his <u>QRZ bio</u> to see his contributions to the hobby and the list of presentations he has given at various conventions.

**Door Prize Winners:** David KA4KKF and Jim KD4PDY - \$10 HRO Gift Certificates.

Submitted by: Dallas N4DDM





## **Events – GARS and others**

ADD		CCTIN	IG INFO	
ANN	LCUNI			

From ARRL Contest Calendar > For more information click the links <

(no ARRL contests in May)

June 2021

12-14 <u>June VHF</u> 19 <u>Kid's Day</u> 26-27 <u>Field Day</u>

July 2021

10-11 IARU HF World Championship

August 2021

7-8 222 MHz and Up Distance Contest

September 2021

TBD <u>EME - 2.3 GHz & Up</u>
11-13 <u>September VHF</u>
18-19 <u>10 GHz & Up - Round 2</u>

October 2021

18-22 School Club Roundup TBD EME - 50 to 1296 MHz

November 2021

6-8 Nov. Sweepstakes - CW
20-21 Nov. Sweepstakes - Phone
EME - 50 to 1296 MHz

December 2021

3-5 <u>160 Meter</u> 11-12 <u>10 Meter</u>

January 2022

1 Straight Key Night

1 Kid's Day 8-9 RTTY Roundup

15-17 January VHF Contest

February 2022

14-18 School Club Roundup 19-20 International DX – CW

March 2022

No planned contests **For more information:** 

April 2022

10 Rookie Roundup – Phone http://www.arrl.org/contest-calendar **HAMFEST CALENDAR** 

[Please confirm the status of a Hamfest before making plans to attend. -

Ed.]

05/29/2021 - Wormfest

Location: Pinellas Park, FL Type: ARRL Hamfest

**Sponsor:** The Glorious Society of The Wormhole

Website: http://w4orm.org/

06/12/2021 - 2nd Annual Pre-Field Day Tailgator Gathering

Location: Dade City, FL Type: ARRL Hamfest

**Sponsor:** Dade City Masonic Lodge **Website:** <a href="http://dadecitymasoniclodge.com">http://dadecitymasoniclodge.com</a>

06/12/2021 - K4KDI Summer Tailgate 2021

**Location:** Orlando, FL **Type:** ARRL Hamfest

**Sponsor:** South Conway Baptist Church

Website: http://

06/19/2021 - Black Warrior Hamfest

Location: Northport, AL Type: ARRL Hamfest

Sponsor: Black Warrior Hamfest Website: http://BlackWarriorhamfest.org

08/14/2021 - Fort Pierce Hamfest

**Location:** Fort Pierce, FL **Type:** ARRL Hamfest

Sponsor: Fort Pierce Amateur Radio Club

Website: <a href="http://FPARC.ORG">http://FPARC.ORG</a>

08/21/2021 - 08/22/2021

Huntsville Hamfest, ARRL Southeastern Division Convention

Location: Huntsville, AL Type: ARRL Convention Sponsor: Huntsville Hamfest Inc Website: https://hamfest.org

**08/21/2021 - TarcFest XLV Location:** Tampa, FL

Type: ARRL Hamfest

Sponsor: Tampa Amateur Radio Club Website: <a href="http://www.hamclub.org">http://www.hamclub.org</a>

10/08/2021 - 10/09/2021

56th Annual Melbourne Hamfest, ARRL Florida State Convention

**Location:** Melbourne, FL **Type:** ARRL Convention

Sponsor: Platinum Coast Amateur Radio Society

Website: http://pcars.org

For more information: http://www.arrl.org/hamfests-and-

conventions-calendar

When searching by division, remember some states adjacent to GA are

in different divisions:

Southeastern: GA, AL, FL Delta: TN Roanoke: NC, SC





Stone Mt. Hamfest November 6-7 2021 on the GARS 147.075 MHz repeater  Holiday Party December 14 2021	GARS Events Calendar for 2021		GARS Recurring Calendar		
75 Celebration Dr., Suwanee, GA 30024	General HamCram Dog Show Fundraiser Georgia QSO Party North metro area Fox Hunt Memorial Day Parade ARC/KARC Hamfest Field Day Tech HamCrams JOTA Maker Faire Stone Mt. Hamfest	TBD April 1-4 2021 April 10-11 2021 April 2021 May 31 2021 TBD June 26-27 2021 TBD October 16-17 2021 TBD November 6-7 2021	December): Monthly Club Meeting (online until further notice)  • 3rd Tuesday of the month at 7 pm (except December): Monthly Workshop (online until further notice)  • 2nd Sunday of the Month at 2 pm GARS Ham Exam Session 690 Airport Rd Lawrenceville, GA 30046  • Every Monday at 7:30 pm: GARS Want, Swap, Sell, and Information Net on the GARS 147.075 MHz repeater  • Every Monday at 8:30 pm: ARES Training on the GARS 147.075 MHz repeater  • Most Saturdays at 7:30 am: GARS Weekly Breakfast Cracker Barrel Restaurant		

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						Breakfast at Cracker Barrel in Suwanee 7:30 AM
2	7:30 – 8:00 PM GARS 2M Net	7:00 – 8:00 PM GARS Exec Meeting (Online)	5	6	7	Breakfast at Cracker Barrel in Suwanee 7:30 AM
GARS VE Exam Session EAA 690 Hanger	7:30 - 8:00 PM GARS 2M Net	7:00 - 8:00 PM GARS Meeting (Online)	12	13	14	Breakfast at Cracker Barrel in Suwanee 7:30 AM
16	7:30 - 8:00 PM GARS 2M Net	7:00 – 8:00 PM GARS Workshop (Online)	19	20	21	Breakfast at Cracker Barrel in Suwanee 7:30 AM
23	7:30 - 8:00 PM GARS 2M Net	25	26	27	28	Breakfast at Cracker Barrel in Suwanee 7:30 AM
30	31 7:30 - 8:00 PM GARS 2M Net Dacula Parade 7:00 AM - 1:00 PM					





# **Local VE Sessions & Meetings**

### **Local VE Testing**

# [Please check with each session contact for current status.—Ed.]

GARS publishes Metro Atlanta VE exam schedules as a service and is not responsible for errors or changes. Call and confirm schedules before going. All sessions are walk-in, unless otherwise noted. Take copies of current license and certificate of completed elements with you to all sessions. Find additional sessions online at <a href="http://www.arrl-ga.org">http://www.arrl-ga.org</a>

#### First Sunday, ODD Months

2 pm (Jan, Mar, May, Jul, Sep, & Nov)

**VEC: WCARS** 

Braselton Public Utility Building 4986 Highway 53, Braselton, GA

Contact: Nat Christman K4VQ, 678-371-7103

christmans30680@gmail.com

#### First Sunday, EVEN Months

2 pm (Feb, Apr, Jun, Aug, Oct, Dec)

VEC: WCARS

Hall County EOC

470 Crescent Dr. Gainesville, Ga.

Contact: Perry Roper, KO4RD (770) 536-3056

#### **Second Saturday**

10:00 AM

Alpharetta North Park, Adult Activities Center 13450 Cogburn Rd, Alpharetta, GA 30004

Contact: lan Kahn, KM4IK E-mail: km4ik.ian@gmail.com

#### Third Saturday, ODD Months

VEC: ARRL

9:30 am (Walk-ins welcome)

Stone Mountain Masonic Lodge

840 VFW Drive

Stone Mountain, GA 30083

Contact: Frank Haynes, KV4SP

Email: <a href="mailto:fhaynes@vatmom.net">fhaynes@vatmom.net</a>

(678) 467-3712

#### First Sunday, EVEN Months

VEC: WCARS and W5YI

2 pm @ Barrow Co. Emerg. Serv. Bldg

66 McElroy Street Winder, GA 30680

Contact: Mike Wolcott, W4WYI

(404) 281-6581

E-mail: W4WYI@ARRL.net

#### **Fourth Tuesday**

ARRL VEC

7 pm @ United Way Service Center 6279 Fairburn Rd., Douglasville Contact: Jessie Clower, KB4WFK

(770) 942-6466

#### **Fourth Sunday**

2:30 pm Georgia Tech VanLeer Elec. Building

Rm. W218, 777 Atlantic Dr.

For more information go to <a href="www.w4aql.com">www.w4aql.com</a> and click

on "Test Sessions"

### **GARS VE Testing**

The GARS VE team provided the Technician Ham Cram testing resulting in 5 new hams.

#### **Second Sunday**

VEC: W5YI

2 pm

Beginning on May 9, 2021

Face Masks: Preferred (but not mandatory)

 Temperature Checks: If you don't feel well, please be respectful of our volunteers and stay

At the EAA 690 Airport Hanger Contact: Dave Bruse, W4DTR

E-mail: exams@gars.org

GARS VE Team Leaders E-mail: <a href="mailto:exams@gars.org">exams@gars.org</a>

GARS VE Website: http://gars.org/exams



#### **Local Meetings**

[Please check with each club for meeting schedule and method (online, etc.) - Ed.]

#### First Tuesday

Kennehoochee ARC

Fire Station #1, Training Room

112 Haynes Street, Marietta, GA

Meeting begins at 7:00pm Talk In 146.880(-)

#### First Thursday

Atlanta Radio Club

Georgia Red Cross HQ

1955 Monroe Dr., Atlanta, GA

Meeting is at 7:30pm

Talk In -146.820(-)

N.E. Georgia ARC

Commerce Public Library

1344 South Broad Street, Commerce, GA

Meeting is at 6:30pm

Talk In - 147.225(+), PL 123.0

#### **Second Monday**

Georgia Tech ARC

Room W218

Van Leer Electrical Engineering Bldg.

Georgia Tech Campus

Meeting at 7:00pm

Sawnee Amateur Radio Association

Beaver Toyota

1875 Buford Highway, Cumming, GA

Meeting at 6:30

#### **Second Thursday**

Alford Memorial Radio Club

Annistown Road Baptist Church

Annistown Rd & Spain Rd

Stone Mountain, GA

Dinner at 6:00pm, Meeting at 7:30pm

Talk In - 146.760(-)

#### **Second Saturday**

North GA QRP Club

Board Room of The Shepherd Center 2020 Peachtree Rd, NW, Atlanta, GA

at 10:00 AM

#### Third Tuesday

North Fulton Amateur Radio League Alpharetta Recreation & Parks Dept. Alpharetta Adult Activity Center

13450 Cogburn Road, Alpharetta, GA

meeting at 7:30pm Talk In - 145.47(-)

For more information, go to:

http://www.gars.org/





# **FCC License Test Information**

### FRNs Now REQUIRED at Exam Sessions

The FCC has indicated VECs/VE teams should no longer be accepting social security numbers at exam sessions. Examinees who don't already have a Ham Radio license should register in the FCC CORES registration system and receive an FRN before exam day. Licensed Ham Radio operators should already have an FRN printed on their license.

FCC CORES User Account and Registration: https://apps.fcc.gov/cores/userLogin.do

### What to Bring to an Exam Session:

- A Government Issued Photo ID Driver's license, Passport, etc.
- An FRN (see note above)
- Minors without a Photo ID must bring their SS Card and Birth Certificate
- Face Mask Preferred (but not mandatory)
- Two (2) copies of your original license
- Your original CSCE and two (2) copies for any outstanding elements passed
- A pen and a pencil with eraser
- A simple calculator (memory must be cleared) CELL PHONES ARE NOT ALLOWED
- Current Exam Fee CASH Prefered
- Check with the Exam site if walk-ins are welcome or registration is rquired
- \*\*\* Cell phones, Smart watches, Bluetooth headsets, earbuds, etc. \*\*\*
- \*\*\* MUST BE TURNED OFF AND PUT AWAY \*\*\*





# **GARS Supporters**

[Note: Ham Radio Outlet is open to limited walk-in traffic! Masks are required.]

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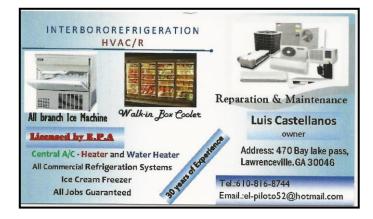
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